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Reduced Fare

We desire to call attention to the members of the A. E. S. who anticipate attending the Annual Convention to be held in Milwaukee, June 30th, July 1st, 2nd, and 3rd, that it may be possible for them to return at one-half railroad fare if attendance is large enough and the members when purchasing their tickets will ask for a certificate, so please don't fail to secure a certificate when buying your ticket to Milwaukee. We want at least two hundred and fifty.

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EDITORIAL

PRESIDENT CLARK'S ADDRESS

By Royal Clark, President Newark Branch

Members of the American Electroplaters' Society, guests and friends: On behalf of the officers and members of the Newark Branch American Electroplaters' Society I most cordially welcome you to our educational session and 6th annual banquet and trust you all will have a profitable and enjoyable time. We are glad to see so many representatives of other branches here. A glance at the program prepared by the educational committee, under the leadership of our able librarian, Mr. Faint, should convince you that the addresses, papers and discussions, will be of exceeding interest to all assembled, and I sincerely trust that many will be benefited.

If this session will cause a dormant inspiration and enthusiasm to blaze forth and inspire one electroplater to delve; in using this word, if you will permit me to digress or deviate a moment, I do not mean, as one definition of the word is, "to turn over or dig the ground," but figuratively, to make laborious research. The slang definition is to drudge, slave, work hard. While I do not believe in drudgery or slavery, I am quite certain that hard work along the lines of electroplating will not kill any man. But as to slavery, I sometimes feel as though I were a slave to the fascination of electroplating, and am prone to think that my family is of the opinion that I think more of my vocation than I do of them; especially when in one instance I was installing and operating a plating department in South Carolina and did not see my family for four months; on

another occasion in West Virginia, five months, and the past two months installing and operating a gold and silver-plating department in Baltimore, Md., seemed like six months. However, laborious research is to be commended. Allow me to reiterate: If this session will cause a dormant inspiration and enthusiasm to blaze forth and inspire one electroplater to delve deeply into the study of the principles of electrodeposition and the solving of problems which confront him, I am sure that the founder of this society, Mr. Charles H. Proctor, the speakers and the committee will feel that their efforts will not have been in vain.

The chairman of the Educational Committee asked me what I was going to speak about; my answer was "about five minutes." I will reiterate the statement which I have so many times made, "that I would much rather write a thousand-word article or paper upon electroplating and read it to you or have it published that you could read it at your leisure than to get up and make a speech."

When I bring to my mind's vision, that first meeting called by Mr. Proctor in March, 1909, and answered by a few electroplaters; one of which I have the honor to be; then gaze upon this large gathering here this afternoon, keeping in mind also the wonderful conventions we hold each year and the progress the A. E. S. has made in many ways, not forgetting that two of our members, viz.: Dr. William Blum of the U. S. Bureau of Standards and George B. Hogaboon, are the authors of a book on Electroplating, published recently; also H. H. Reama, author of a book on plating, published several years ago, convinces me that our society is built upon a firm foundation and can safely predict that the time is not far distant when it will be on a par with scientific societies.

There are a few thoughts which I desire to convey to those who are not members of our society, yet are eligible, and to those who in the near future will be able to qualify, regarding the benefits which are to be had as a member.

Good fellowship is interspersed throughout the meetings and conventions, and to attend a convention such as Providence held last year, to meet and converse with fellow members after a lapse of a year or more, cannot help but cause a feeling of good fellowship to eminate from the

heart, which I believe is instrumental; like the trowel, which is used in spreading the cement which unites the building into one common mass, in cementing friendship between one another. Permit me to state that my fifteen years of membership in this society have been of untold benefit and happiness through contact with members. Our motto, "Knowledge is Power," looms upon the horizon like a rainbow after a shower of rain, when you have mastered the methods of analyzing electroplating electrolytes. Here I am compelled to speak of our past president, Mr. Oliver Sizelove, our instructor in the chemical analysis of solutions. The value of this course was brought most forcibly to me just recently. When called upon to analyze 6 nickel, 3 copper, 2 brass and 2 silver solutions in a plant where the foreman had been in charge 22 years, I found that the metal and free cyanide contents were anything but uniform or up to standard. One item was exactly the same in five nickel barrels plating solutions, that was the ammonia contents which was 9.3 C. C. per gallon, the sixth one was 12.5 C. C. per gallon. The nickel content varied from six ounces nickel per gallon to 2.6 oz. per gallon for plating barrels. To cite a case which proves that Mr. Sizelove's methods are accurate: From silver solutions analyzed, 1.4 oz. free cianide and 3.6 oz. respectively: One of the tanks —a small one lined with sheet lead, but which had no asphaltum paint to cover it—was being silver plated on the bottom and sides. This solution was put into the larger tank, which was only half full and not being used, mixed, allowed to settle, and upon analysis was found to contain 2.5 oz. free cyanide. By adding 1.4 oz. and 3.6 oz. and dividing by two to get the average 2.5 oz. results.

Very often platers will say that they are getting along in years and think it is too late to begin to study chemistry or electricity. Just here I am reminded of a statement made by Prof. Henry of the Smithsonian Institute at Washington, who once said to a gathering of educators and scientists: "Why, gentlemen, I am only a learner," and yet he was sixty-five years old and the most erudite or scholarly man in America at that time. So, we all can keep right on learning. I have spent nearly a quarter of a century—twenty-four years to be exact— in the electroplating

industry and intend to keep right on learning all I can about my chosen vocation.

But I must not consume any more of your time, as there are speakers to follow who have something of interest to say to you. So let me, in closing, impress upon your mind that we are never too old to learn and we should strive to increase our knowledge along the lines of electrodeposition of metals. I THANK YOU.

ZINC CYANIDE PLATING

by Willard M. Scott, Read at Newark Branch Banquet

1. The use of zinc in cyanide plating baths involves a greater amount of consideration than is usually supposed.

2. Although cyanide plating is not used to the same extent as other methods of obtaining zinc coatings, it is far more efficient from an endurance standpoint.

3. In spite of the fact that it is a superior deposit and gives more satisfaction in service, the amount of attention it receives from platers compared with that given other methods of applying zinc is negligible.

4. Zinc coating is to date the foremost practicable method of rust prevention. I will omit reference to other methods and deal only with the practical side of the manipulation of cyanide baths.

5. Abouth three months ago, I represented the American Electroplaters Society at a meeting of the American Engineers' Standard Committee held in New York City. The Committee called a meeting of all organizations interested in standardizing the coatings of zinc coated products. At this meeting the zinc coatings were criticized for peeling, chipping and their inability to prevent rusting, and the committee came to the conclusion that specifications on all zinc coated products for outdoor and indoor requirements should be developed. When approved, these specifications will be the standard, and to conform with their requirements, we must adopt a more scientific procedure in the manipulation of our zinc cyanide baths.

6. As an extreme example of what may be accomplished with zinc plating, I have here a rather complicated article, known as a fuze body. The specifications for the manufacture of this fuze body call for a uniform plating of

.001 of an inch over all surfaces inside and outside. To comply with these rigid requirements, it is necessary to have a thorough knowledge, not only of the solution itself, but of its application.

7. To operate a zinc cyanide solution successfully requires the observance of the following rules:

(a) Always bear in mind that you are operating a cyanide and not a caustic bath.

(b) The anodes must always be clean, particularly of zinc hydrate and excess cyanide.

(c) An approximately constant proportion should be maintained between the anode surface and the cathode surface, otherwise the solution will become foul.

(d) Do not attempt to replenish the solutions each day from a stock solution.

(e) Do not try to operate the bath without an ammeter. The ammeter is the foundation of successful plating and is the indicator for your troubles.

8. We cannot expect to have analyses made of solutions every time the deposits are not up to the standard, such as blistering, brittleness, light and coarse deposits, not plating in deep recesses, etc.

9. With eleven tanks of 150 gallons capacity each, as we have operated at the Frankfort Arsenal, it would be out of the question to have an analysis made every time trouble occurs. Sometime ago, by constantly checking up by analysis, I was able to establish a routine procedure and follow it with satisfactory results.

10. I will now illustrate the importance of the ammeter pertaining to zinc cyanide plating. On production work the cathode surface is the same every time, therefore, the ammeter of that tank should read the same at all times at the same current force; if not, the conductivity of the solution is not normal. The first correction should be for sodium cyanide, the proper percentage being determined by the ameter. Sodium cyanide is added until the meter again registers the proper amperage.

11. The second step is to correct for sodium hydrexide. This is done by actual plating in a deep recess, such as in

the fuze body I have spoken of. A solution weak in sodium hydroxide lacks throwing power and will therefore not plate the recess to its full depth. Sodium hydroxide is therefore added until the recess is completely plated.

Care must be used, however, to make sure that too much sodium hydroxide in relation to the cyanide is not added, for then the result is a caustic instead of a cyanide bath. These additions can be made during plating without injury to the work. However, if blistering or brittle deposits result, the excess cyanide is taken care of by zinc cyanide, but this cannot be added during plating.

12. The solution used in plating the fuze bodies contains the following ingredients:

	Oz. per gal.
Sodium cyanide	8
Zinc cyanide	10
Sodium hydroxide	10¾

13. A solution will very seldom need zinc if you follow the system mentioned; the zinc content was approximately the same after one and a half years of constant use.

14. I will outline briefly the method of plating these fuze bodies:

1. The fuze bodies are boiled in the soda tank, rinsed, dipped in hydrochloric acid, rinsed and hung in carbonate of soda solution for storage. This solution will also kill the acid in the pores of the steel.

2. Twenty pieces are placed in a plating tank. The surface of 20 bodies is a total of 1,030 square inches for the cathode. Anode surface is 1,080 square inches, thus standardizing the cathodes and anodes conditions. These measurements can be calculated by an ammeter.

15. There is no rheostat at each tank. The voltage throughout is three volts; therefore, the solution controls the amperes, and must be maintained as such, which will govern the structure and properties of the deposits.

16. It requires one hour at 19 amperes per square foot to complete this operation. Ten minutes of this time is taken up by an inside zinc-plated steel anode.

17. The work with a deposit of .001 of an inch through-

out is removed and subjected to a blast of compressed air to prevent any discoloration. This is essential because of the rigid visual inspection, where fifty different gauges are used after plating to determine the thickness of the plating. This rigid inspection is necessary because of the close fit specified for assembled parts.

18. Specifiations calling for a test in a salt spray of 20 per cent. for 96 hours might be considered severe, but under these conditions no rust has ever shown itself. As a matter of face, on two different endurance tests one of these bodies stood 30 days in constant spray, or 720 hours, with no sign of corrosion. A second stood 25 days before rust appeared. These bodies were taken from ordinary work, and I am convinced all bodies will stand a similar test from this solution.

The members present who attended yesterday morning's session of the Electrochemical Society, held in Philadelphia, will recall the interest shown on the immersion test as an aid in ascertaining the endurance of the deposit, and you will recall the favorable comments it received over that of the salt spray test, but at the meeting I refer to in New York City the immersion test was unfavorably received, and although the salt spray test was commended it did not receive full support, due to the fact that it did not help those who were interested in stopping chipping and peeling, so, you see, this is quite a proposition.

But the immersion will enlighten the plater on the amount of znic on his work, and it is up to himself to know if it is deposited there properly.

19. Other work at 19 amperes per square foot for ten minutes stood 133 hours, and there is no reason to doubt that such results cannot be obtained commercially on all products and fabricated articles, and the comparative cost between zinc cyanide and other methods is approximately the same.

April 16, 1924.

JOB SHOP PRACTICE

This subject is so broad that to deal with it in all its details would take up too much time and space, so I'll just outline some of its phases. Job work at times presents many

problems and to overcome these, unless the plater understands them he is in a quandary and perforce must seek the desired information from those who do know. A great part of the work that enters the job shop has at one time or another been nickel plated and this plating is not altogether adherent and the article should be first cleaned to remove organic substances, then the old plating removed. The best method is by electrostripping in a sulphuric or hydrochloric acid solution. If it happens to be iron or steel it may have become rusted in places and pickling is resorted to which may be done by any of the various pickling processes, then rinsed and dried off and sent to the polishing room.

Brass or copper articles that have been previously nickel plated are stripped in a similar manner. This work may come from the strip with a yellowish-brown scum on it which may be removed by the use of a strong cyanide dip, and if there is a background it should be bright dipped, dried off and sent to the polishing room.

Antimony and lead or its alloy that has been previously nickel plated may be stripped in the bright acid dip without injury to the metal and then dipped into a muriatic acid solution for a short time to loosen the oxide and wet scratch brushed, dried off and polished if necessary. If these two metals or its alloy have been brass or copper plated the same procedure is carried out if necessary.

Zinc, die castings or aluminum that have been previously nickel plated are stripped in a similar manner as brass or copper and care must be taken not to leave them in too long or they will become spoiled, then given a momentary dip in the muriatic acid solution, wet scratch brushed, dried off and polished if **necessary.**

Articlesthat have **been** previously brass or copper plated steel or iron may be stripped by the electric current by using a strong cyanide solution.

Aluminum articles may be stripped by using the sulphuric-nitric acid dip.

On zinc or die cast metal it must be brushed or polished off, as the dips or strips would ruin it. It is taken for granted that where electro strips are used that the article to be stripped is made the anode and also that water rinsing is resorted to after each dipping process.

Now, as to polishing, if this work is very bad the first operation is the roughing out, which is done with wheels set up with coarse emery, and is then fined out with wheels set up with a finer grade of emery which will remove all the previous cuts made by the coarse emery. These two operations are usually done dry. The next operation is done with what we call a grease wheel. This is set up with a grade of the finest emery when grease or oil is applied to, as will remove the previous cuts quickly. On iron or steel this is usually the finishing operation previous to plating, but if a finer finish is required a fourth or finer wheel is used. Now I consider that in many instances four wheel work is quicker and less expensive than three wheel work and will have a far better finish inasmuch as after plating it takes less time and material to finish and emery is much cheaper than buffing compounds.

A great deal of this work while it has been in use becomes nicked in places so it is only necessary to rough out these spots instead of doing it all over previous to using the next grade wheel copper, brass, lead, zinc, aluminum, die-castings and antimonial led articles should always be finished with a fine grade of emery previous to buffing which can be accomplished with ease and a great saving of material.

As there are so many different kinds of metals to be polshed it is impossible to have the proper speeds required to polish them especially where both polishing and buffing is done on the one machine, therefore the speed of the machine should be set so as to accomplish the desired ends.

To realize what some of this job work is, some of you who work on production work have had some of it go bad and being too busy to refinish it at the time and having no proper place to put it have very likely thrown it in a corner or under a bench until you have more time which might be two or three months later and then pull it out only to find it has become badly corroded and you wonder how you are going to get them looking respectable.

Some of the job work is lke that and some is worse. Now we come to the plating end of it and some of this work must be wired up before cleaning and let me say right here that there is a right and a wrong way to wire up work, some of it will be overlapping and cause shading which is not desir-

able. Then comes the cleaning proposition and this is where the most troubles arise, and you that have electro-cleaning solutions have the least worries, as you know that there are very few job shops that have them. We have to work with the still solution and I wish to corroberate a statement made by a member at a previous meeting that if an article is cleaned properly it will plate in an indifferent solution. In cleaning, speed is required and to my mind there are two kinds of speed, one is doing it quickly and properly and the other is too **much** haste, which is the longer and more unsatisfactory way as some ofus know to our sorrow.

Steel or iron may be left in the cleaner for a considerable time without injury but brass or copper if left in too long will become so badly tarnished that it will be necessary to repolish it. Antimony, lead or die cast articles are probably the hardest to clean. When doing this work I have always found that the quickest method is to handle a few pieces at a time and I have very little trouble with them. It you try to do too many at one time they will become oxidized and the plating will be sure to peel off and you wonder why? You are quite sure you cleaned them right because you dipped them in this and that and the other thing and brushed them this way and that way and all the time they were getting worse. Always make sure the work is clean, don't blame it on the solution.

The plating of job work requires considerable thought and study and this is sadly lacking. As long as a piece of work is finished with a shine to it, the plater will say, "Oh! that's good enough." But is it? From the consumers point of view, they pay what is asked, but don't always get what they pay for. The uses to which the articles are subjected should be considered. Take automobile trimmings for instance, most of these parts require a heavy plate (especially where they are exposed to the weather). The same may be said in regard to bicycle parts and stove parts, etc., if this is not done it is very likely to become rusted within a very short time.

Some articles only require a medium plate such as phonograph parts, furniture trimmings, etc., while other articles too numerous to mention, that only require a bright nickel plate is either plated bright or given just sufficient plate so

that it can be color buffed with speed, whereas if a heavy plate were put on some of these articles it would be very difficult to buff them satisfactory and otherwise would take too long and that would not do.

HOW TINSEL IS MADE

By Charles H. Proctor

Tinsel, gaudy, tawdry tinsel,
Glittering through the holly bedecked windows
Into the snow laden street,
Reflecting its sunshine into the faces it meets;
Flashing, dancing the delight of young and old,
When Christmas comes the story of tinsel never grows old.

And so this afternoon I am going to tell you something about tinsel and how it is made.

To me there seems to be a halo around tinsel, because, in my childhood's memory, it stands out more prominent than anything I know of. It brings back memories of childhood's happy hours of the Christmas tide of long ago. Tinsel somehow seems to me like the memory of beautiful flowers in the garden of memory that will linger while life lasts and will never fade. Thomas Moore, the poet, speaking of flowers, said:

You may destroy the flowers,
Break the vase if you will,
But the perfume of the flowers
Will remain with it still.

When and how tinsel was first produced I have no idea, but me thinks that the City of Lyons in France may have been its birthplace, because, in the famous old city of France, silvered and gilded copper wire was first made for the production of gold and silver brocades and military braids. The gold-plated copper wire is still made in this famous old city. Germany, previous to the war, made quantities of gilded and silvered copper wire, but today America produces more than 90 per cent. of all the silvered copper wire that is used. All the imitation gilded copper wire is produced here; there is only two or possibly three firms that produce such product. The greatest producer of all is the Hudson Wire Company of Ossining, N. Y. There

has appeared upon the market at the Christmas season the past two years a lead tinsel, or rather a fine lead shavings, but as compared with true tinsel it is but as dross as compared with a virgin metal. To tell the true story of the origin of tinsel it would be necessary to go back millions of years before the advent of man, when the earth was in the making; when all was chaos, and the earth was a molten mass like the molten lava in the crater of Vesuvius, and then perhaps after more millions of years become a fixed orbit, then followed the cooling process when metals separated or became segregated and copper was one of the most important metals that nature bestowed upon man. From whence and whither it came, like all things we know not, but without copper the modern wonders of electricity in our every day life could not have become possible, as we understand the nature of things today, unless the great Creator of all things in His Divine plan had given to man another metal that could have replaced copper.

Iron is the king of metals, copper is the queen, and without these two royal metals our modern world of electricity would never have been possible unless nature had given us metals to replace them.

True tinsel is a combination of the wire drawers' and the electroplaters' art. It commences when the copper ore is taken from the earth, then through the refining process it is cast into rods. These rods are rolled hot through steel rolls and through successive stages that reduces its diameter and increases its length. It finally reaches the stage where the wire drawer plays his part in the beginning to reduce its diameter and increase its length. Hard cast steel dies are used until it reaches a diameter of 20 B & S gauge or .035 decimal gauge. When this diameter has been reached the copper wire is then bright annealed in air-tight iron pots and when cool again is cleansed in cyanide solutions; after thoroughly washing it is then ready to start on its way to become tinsel.

This sample of copper wire I hold up to your gaze is the starting point from now on until the completion of the wire drawing operations. Diamond dies are used. The holes of definite sizes are drilled through the diamond with steel drills and diamond dust. You have allheard the old

maxim that diamond cut diamond. The hole in each successive die must be smaller than the previous one, so that the diameter of the wire is constantly reduced until the minimum size wire results, usually from 2 to 3 one-thousands of an inch thick or about 38 B & S gauge. The die I hold up for your gaze is a diamond die set in its holder of babbitt metal and brass to hold the diamond in a secure position during the wire-drawing operations. The silver plating process commences when the copper wire is reduced to 20 B & S or .035 decimal gauge. The methods of plating are continuous. The mechanical methods entailed are similar to those shown in Langbein's Electro-Deposition of Metals, covering the gilding and silvering of copper wire. Many improvements have been made in the mechanical features by the progressive manufacture. The process is now more absolutely controlled than thirty or more years ago, when I first became interested in gilding and silvering of copper wire. I have played some part in the present methods of production, and can state that the silvering of wire is perfectly controlled mechanically, electrically and chemically. The silver solution is composed of sodium and silver cyanides, the metal content 4 to 5 ozs. per gallon, the sodium cyanide content, so far as free cyanide is kept low but a concentrated solution is constantly dropping into the silver plating tank to keep up the maximum of anodic reduction and cathodic deposition. This is possible because silver, unlike many metals, does not deposit under the influence of hydrogen, so Faraday's law can be used to the maximum without figuring any loss of current density, due to hydrogen evolution and deposition. The cleansing of the copper wire is accomplished by drawing the wire through a diamond die that slightly reduces the diameter of the wire; as the wire comes from the die it is clean and bright and free from oxide. Thus the wire enters the plating solution passing over a bright, hardened steel negative contact roller that is revolved to compare with the speed the wire is entering the solution. The wire is run down into the solution and then up again vertically over a series of rolls specially made. Those at the bottom of the tank are made from glass suitably sand blasted so that the wire will not slip the upper rolls above the solution of bright, hardened steel.

Under the influence of the current the upper rolls become coated with silver to some extent. I am not positive as to the total length of wire exposed to the solution, but believe it is about 100 ft. Many strands of wire are passing through the solution at one time, so the total length being plated at one time will approximate 2,000 ft. The upper steel rolls are grooved so that the twenty strands of wire can be kept uniformly apart. It required some tact and skill to make suitable mechanical equipment to take care of the speed of movement of the wire through the solution and then to rewind it again upon spools as it passes through the solution.

It requires no washing operations as the silver plated wire exits from the solution. It is drawn through a diamond die again that slightly reduces its diameter. The solution thus acts as a lubricator and returns again to the tank. The wire is thus spooled up clean and dry.

The amount of silver deposited is 1 per cent. of the total weight of wire. In other words, 1 lb. of metallic silver is deposited upon every 100 lbs. of wire starting at 20 B & S gauge or .035 decimal. As the surface area of the wire is always the same, the current factors as first determined upon can always be maintained so the operations are in a sense purely mechanical and has become an engineering factor.

The wire thus silver plated is now drawn through diamond dies until its diameter is reduced to 3 one-thousands of an inch. At this diameter it is ready to be made into tinsel. The adhesiveness of the silver deposit must be positive, otherwise in the reducing operations, through the diamond dies, it would be removed and give a copper wire instead of a silver wire. The ductility and malleability of silver and copper are about equal so the elongation, due to the drawing process, is about the same. The wire reduced to its final stage has the splendid burnished surface, such as I hold in my hand, wound upon spools, it is ready to be flattened into tinsel.

There is a silver and gold tinsel; the gold color is not a gold but a high brass color, that is produced upon the copper wire, not by brass plating but by vaporization. Brass plating has been tried many times without success.

The brass deposit always becomes brittle after plating in the ensuing drawing operations, so has been discarded in favor of the vaporization method.

Anyone who is familiar with Cowper Cowles sherardizing methods can readily see that copper as well as steel can be coated with zinc by vaporization of the zinc dust. When the steel or copper is placed in a hermetically sealed steel container heated to just below the melting point of zinc, the vaporized zinc penetrates into the steel or copper. Thus we start to produce imitation gold tinsel. The copper wire usually about 24 B & S gauge or decimal point .022 is sherardized in the manner outlined. It is allowed to cool in the steel or iron sherardizing pots, and is then taken from thence freed freed from the zinc dust of which there must always be an excess in the vaporizing pot. The zinc coated copper wire is ready for the wire drawing operations which are the same as outlined for silver wire.

Zinc, however, is not as malleable and ductile as copper, therefore the elongation of the copper is greater than the zinc. Thus through successive reducing operations the zinc becomes drawn down into the copper, forming a high yellow brass alloy surface on the copper wire which results finally in the imitation gold tinsel, such as I show you, and becomes the imitation gold tinsel of commerce. As previously stated, gold plating of copper wire is not done, to my knowledge, in the United States. I see no reason why.

The present manufacturers of the highest grade of silver plated wire in this country today, and the writer experimented in gold plating fine copper wire more than thirty years ago, and succeeded after much experiment in producing an exact reproduction of the gold-plated wire produced in the City of Lyons, France.

The gold wire produced in France does not tarnish. It matters not how thinly the gold is applied; it is considerably harder than pure gold. After many months of experiment we finally decided that the pure gold deposit was a nickel gold alloy, approximately from 20 to 22 K gold, although the nickel could not be discovered when the gold plate on the French wire was analyzed, we arrived at this conclusion. It was then easy to deposit gold upon the wire

and obtain the same color as the French wire with a non-tarnishable surface.

The silver or brass-coated copper wire is shipped from the wire manufacturers to the tinsel manufacturers in New England. The utmost care has to be used so that the wire reaches its destination in perfect condition. The spools must, therefore, be wrapped in a non-tarnishable tissue paper, then in a waxed wrapping paper to prevent atmospheric action upon the wire or the occlusion of moisture. The shipping cases are almost air-tight. Upon its arrival, after thorough inspection, it is made into tinsel. The wire is merely flattened to a definite thickness, such as you behold from the samples I show you, by the aid of flint-hardened steel rolls, polished to the highest possible lustre. It is this high polish that leaves its imprint upon the tinsel and gives it the splendid burnished appearance that you behold. The rolls must be constantly polished during the rolling of the wire, and so arrangements are made so that sheep skin buffs are constantly polishing the rolls—two sets of buffs are used, one for the top roll and one for the bottom roll. Tin oxide is the polishing medium.

The rolls are about 12 inches long and 3 inches in diameter. As in the plating and wire drawing operations, many strands of wire are rolled at the same time. Provisions are made mechanically so the tinsel is spooled up just the same as sewing cotton is spooled up in the great Clarke Thread Mills in E. Newark. Thus completes the manufacture of tinsel, such as we find in the marts of trade today. Gold and silver-plated wire, as well as tinsel, is used in the production of gold and silver brocades. Silver-plated copper wire is used extensively upon musical instrument wires, such as piano wires, etc., and a hundred other things. My lady of fashion adorns herself with the brocades from the slippers upon her feet to the brocaded hat of fashion dictates, sometimes in silver and sometimes in gold.

Gold plated copper wire is used in naval and military braids that adorn our naval and military officers, uniforms. Foreign ambassadors, who represent their various countries at Washington—the Nation's Capital—bedeck themselves in uniforms resplendent with gold and silver braids and laces. Fine feathers make fine birds, but after all it is the

man who makes the man. Thus my story of tinsel is told. May it reflect into my hearers some of the sunshine of memory into their hearts, as it has in mine while writing this story for you.

A COURSE OF INSTRUCTION GIVEN BY THE PHILADELPHIA BRANCH

Williard M. Scott, Librarian

We will review briefly what we were taught last meeting on the classification of matter. You recall the iron and sulphur that were thoroughly mixed together was again separated by a magnet being drawn through the mixture. We will now heat iron and sulphur together again, forming iron sulphide. As we decided to learn and use equations in our experiment, I will from now on make use of them so we may become familiar with the atoms and mocules in their combining proposition, which is the feature of the illustration in heating iron and sulphur. If we took 56 grams of iron and 32 grams of sulphur, we would have 88 grams of iron sulphide. That tells us that this compound, in relationship has the same ratio:

$$\begin{array}{cccc} Fe & + & S & = & FeS \\ 56 & & 32 & & 88 \end{array}$$

Before discussing the combining of different elements, I wish to show by demonstration the actual breaking up of elements, and this particular one would come under qualitative analysis. The determination of the composition of water is very interesting because the methods employed illustrates the general methods of analysis and brings out the point of the combining proportions we are speaking of. An apparatus that was used for effecting this analysis was of glass bent U-shape with electric charges in each side. As soon as the current passes, bubbles of gas rise from each of the electrodes and collect in upper part of tubes. The gas rising from the negative electrode was found to be hydrogen, while that from the positive electrode was oxygen.

Now, when two or more elements combine to form a compound they do so in definite proportion. This has been proven by the above experiment, for we found water to contain a ratio of 16 to 2, and this shows that 18 grams of water will produce 2 grams of hydrogen and 16 grams of

exygen. This is a fixed definite composition, and to impress this upon us we ground mercury and sulphur in a mortar forming mercuric sulphide. The mercury combined with sulphur forming a black powder, but there was a surplus of sulphur in the mortar illustrating mercury took up only a definite proportion.

Hg+S=232 grams Hg S
200 32 grams
g

Another method used to enable us to determine the proposition by weight in which the hydrogen and oxygen combine was illustrated with a generator containing zinc, which, when treated with sulphuric acid, which gave off hydrogen. The hydrogen was passed through a glass tube containing a boat of copper oxide, which was carefully heated. The hydrogen combines with the oxygen present in the copper oxide to form water, leaving red copper in the boat. The water is absorbed by anhydrous copper sulphate in another U-shaped tube. The operation was continued until an appreciable amount of water had been formed.

The tubes containing copper oxide and copper sulphate was weighed before and after this operation, and we found that the water formed was in the same ratio as the amount of oxygen given off from the copper oxide:

2 parts of hydrogen combines with 16 parts of oxygen
1 part of hydrogen combines with 35.5 parts of chlorine
2 parts of hydrogen combines with 32 parts of sulphur
16 parts of oxygen combines with 2 parts of hydrogen
16 parts of oxygen combines with 23 parts of sodium
16 parts of oxygen combines with 9 parts of aluminum

From this list the combining weights might be derived as follows:

H—2	S—32
O—16	Na—23
Cl—35.5	Al—27

If hydrochloric acid is decomposed by electrolysis the same as we did with water, we would have 1 part hydrogen and 35.5 parts chlorine or combining weights as shown above as 1 gram to 35.5 grams.

What do we mean by combining weights? We refer

to these for illustration. If we expect to intelligently analyze plating solutions we must know these combining weights.

In referring to the fundamental theory with a substance like Hg Cl, called mercuric chloride (or the druggist name, corrosive sublimate), if separated would be Hg Cl for 100 parts of Hg it would unite with 350 parts of chloride. Any substances combining together, combine in their weights.

Analysis is the determination of the constituents of a compound by breaking it up into its component parts and ascertaining the amount of each.

There are two types of analysis: Gravimetric and volumetric.

Gravimetric is to analyze by weight and this method takes skill and study.

Volumetric is to analyze by solutions which is measured by volume. It is not essential to analyze by gravimetric in our line of work.

The volumetric apparatus that will be used in our analytical work was discussed and exhibited, and it is important that we become acquainted with their names and uses; a few of them were burettes, cylinders, flasks, pipettes and a number of other graduated apparatus.

The reading of these is an important factor. The surface of a liquid in a tube of relatively small diameter appears from a point outside and approximately at the same level, as a curve with the convex side down. Such a liquid surface is called a meniscus and its lowest point is the one read. The proper management of these apparatus appear simple, but involves points that beginners frequently fail to learn by themselves; therefore a somewhat detailed description of the procedure will be given at another meeting.

TWO NEW BOOKS ON ELECTROPLATING

By Daniel Gray, Research Chemist, Oneida Community Co.

MODERN ELECTROPLATING, By W. E. Hughes, 160 pp. Published by Henry Frowde, London.

THE PRINCIPLE OF ELECTROPLATING AND ELECTROFORMING, By William Blumm and Geo. B. Hogaboom; vi+356 pp. Published by McGraw Hill Book Company.

The appearance of these two books is indicative of the enlarged field of interest in the electrodeposition of metals.

An examination of the two books shows also the change which has taken place in the attitude of investigators towards this subject, a trend which can be best characterized by saying that electrodeposition is tending from an art toward a science.

A mere glance over the pages of these two books shows a great difference between British and American practice. The former is undoubtedly conservative, and interest is stressed on subjects like deposition of iron, which are not now of prime importance in this country. Only 44 pages are devoted to general considerations, including theory and practice. The major portion of the book is devoted to the individual metals. The book concludes with an interesting chapter on the structure of electrodeposits. While "Modern Electroplating" is an interesting book, it cannot, in the opinion of the writer, compare with the "Principles of Electroplating."

This latter book is exactly what we would expect from two well-known experts. It is extensive enough to serve as a text-book, should our universities ever devote classes to the subject. It is simple enough in parts to render up-to-date informtaion readily accessible to non-technical readers. On the other hand, there is sufficient theory, and more or less difficult technical matter to interest the research investigator. Fully one-half of the book is devoted to general considerations, including chemical theory, cleaning, equipment and those various phases of the electroplating process which apply to all metals in general. It is this portion of the book which will appeal specially to the man setting up an electroplating equipment for the first time, to the student and investigator, and to those practical platers desirous of extending their technical knowledge.

The latter half of the book takes up each metal in turn. Far from being a mere compilation of formulas, this is a comprehensive and reliable guide for the practical plater. The authors have attempted to tell not only "how," but "why."

Taken altogether Mr. Blum and Mr. Hogaboom have rendered a distinct service to the electroplating industry of the country by gathering and systematizing the best current knowledge. Both men are in positions whereby they

are enabled to keep pase with the latest progress and the platers of the United States know them and have confidence in them. The book should strengthen the bonds between theorists and practical men and serve to place electroplating in the dignified position this youngest of the sciences deserves.

BRANCH NEWS

Bridgeport Branch

The Bridgeport Branch held the regular meeting on May 2, with a large attendance, including many out-of-town visitors. President John Slattery presided.

We very reluctantly considered the resignation of President Slattery, accepting it only when John insisted that he had held the chair long enough. We did not see it in the same light, but John finally won.

Accordingly, the following officers were elected for the coming year: President, William Flaherity; vice-president, George Belle; secretary and treasurer, R. J. O'Connor; librarian and sergeant-at-arms, Fred Griffith; board of managers, John Dunn, William Stratton, John Obeender; delegates to 1924 convention, Amos Reeves, R. J. O'Connor, John Slattery; alternates, George Belle, John Dunn, William Thompson.

The following applications for membership were received: Joseph P. Sexton, 23 West Rock avenue, New Haven, Conn.; James J. Scully, P. O. box 226, Fairfield, Conn.; Joseph A. Virgalla, 47 Ash street, Bridgeport, Conn.; Edward E. Andrew, 354 West avenue, Bridgeport, Conn. All of the above asked for active membership.

After the business of the meeting was over we had some very lively discussions on the proposed prize award.

Bill Stratton and George Belle gave a very interesting demonstration or Verde Antique finishes on both copper and brass plates, which held the members' interest until the meeting closed at a late hour.

Detroit Branch

Regular meeting of Detroit Branch, A. E. S., held Friday, May 2, with President B. E. Miller in the chair and a fair attendance. Minutes of previous meeting read and approved.

Election of officers for 1924-25 was as follows: B. E. Niller, president; J. H. Flanagan, vice-president; R. L. Shepard, secretary-treasurer; J. Ambrose, librarian; Otto E. Gollnick, sergeant-at-arms; board of managers, G. Kutzen, B. F. Lewis, Chas. Cunningham; delegates to convention, R. L. Shepard, A. E. Shepherd, Elmer W. Woodmansee; alternates, Miller R. L. Shepard, C. Cunningham.

Papers on "Pitting," by T. C. Eickstaeda and Geo. Kutzen, were ably written and read by the authors, advancing many and varied ideas upon the subject; also quoting an article by Madson, before the Electro Chemical Society, in which he states that all pitting is cured by the addition

of H_2O_2 hydrogen peroxide, so now we all know the way to cure pitting is to add hydrogen peroxide, and it sure will be a cheap cure. The papers brought forth considerable discussion and different views on the subject.

Because of the uncertainty of continued residence in Detroit, Secretary-Treasurer Woodmansee refused to allow his name to be nominated for any of the offices. He was badly broken up by the loss of his wife, whom he interred in Spring Grove Cemetery, Cincinnati, Ohio, on Good Friday.

Meeting broke up at 11 p. m.

Philadelphia Branch

Philadelphia Branch held its regular monthly meeting May 2, with President Gehling presiding.

A. K. Graham gave the third of his series of lectures. The talk this month was on the "Conservation of Mass and Combining Weights." The members are showing very active interest in these lectures ,and there is no doubt but what much practical good will result from them.

Three applications were received.

The newly elected officers are as follows: President, Geo. Gehling; vice-president, D. J. Kathbone; secretary and treasurer, Philip Uhl; librarian, W. M. Scott; trustees, C. V. Bayer, W. J. Bell, P. Gorling; delegates to convention, Geo. Gehling, Philip Uhl, W. M. Scott; alternates, W. Asimus, W. J. Bell, J. E. Underwood.

Dayton Branch

On May 3, at the regular monthly meeting of the Dayton Branch, the election of officers took place. Our past president, Mr. M. G. Kopf, was re-elected by acclamation, but declined the honor on account of his activities taking him from the city frequently, and the possibility that certain business connections may make it necessary to assume associate membership. Mr. Wm. Hohman was then elected president; Mr. H. J. Harter, vice-president; Mr. A. B. Bates, secretary and treasurer.

On the board of managers the following were elected: Messrs. Walter Fraine, Robt. Suman and M. G. Kopf. The delegates to the convention are Messrs. Hohman, Fraine and Suman, with Messrs. J. S. Perry, T. N. Kiser and H. Wright, alternates.

The past officers were given a rising vote of thanks for their efforts during the past year, and the interest and loyalty of the members shown otherwise. The new officers were pledged the co-operation of the branch for th coming year. The enthusiasm shown portends a healthful future for the Dayton Branch.

Cleveland Branch

April 26, 1924, the regular business meeting of the Cleveland Branch of the A. E. S. was held at the Hotel Winton. The meeting was opened by President Ter Doest at 8 p. m. The minutes of the previous meeting were read and approved. Among the correspondence was a letter from the Detroit Branch suggesting an amendment to the constitution by adding a section to Article 2, Part 2 (sustaining membership). These num-

bers to represent manufacturing concerns operating planting departments and representatives of supply houses without qualification as an active member or chemist. This was bitterly fought and the Cleveland Branch will instruct their delegates to the convention to vote against this amendment. After all business was taken care of we had a general discussion which proved very interesting to all. Adjournment was called for at 10:45 p. m.

Waterbury Branch

At the last meeting of Waterbury Branch, Mr. Howard Rice, superintendent of the Apothecaries Hall Foundry, gave an interesting talk on the construction of nickel anodes. Mr. Rice started with the building of the furnace and finished with the insertion of the hooks. The speaker accompanied his talk with an exhibit of various forms and makes of nickel anodes and hooks. A number of communications from various branches throughout the country relative to proposed business for the coming supreme convention were received and thoroughly discussed. Particular interest was manifested in the proposed amendment to the Constitution relative to sustaining memberships, and introduced by Detroit Branch. It seemed to be the consensus of opinion that the manufacturers would be more liable to become interested in the doings of the A. E. S. if they could be shown some practical results from their contributions or sustaining memberships. With the fund created from this source it would seem that much good could be accomplished in the way of research work. A question asked by one of the members was the subject of an interesting debate. It seems that on the occasion of the recent flood in this city, one of the rivers overflowing its natural course, invaded the plating room of this member and uncermoniously lifted the plating tubs from their supports. The result was a liberal mixture of brass solution and river water. Fourteen new brass solutions had to be made up, and as might be expected, a little difficulty was experienced in getting all a uniform color at the start. The question was: "Of what practical assistance would a thorough knowledge of chemistry be to a person in such a situation? Would it have enabled him to get a uniform color at the start?"

Hartford—Connecticut Valley Branch

Hartford-Connecticut Valley Branch devoted its April meeting night to an auction box social and entertainment. Most of the members brought their wives and there were several visitors.

A very entertaining program had been arranged by M. MacFadyen. There were several vocal and piano solos, a vaudeville comedian and an exhibition of magic by Mr. Stoddard of this branch.

Following the entertainment the lunches were auctioned off to the men, who were privileged to eat what they bought with the lady whose name was written inside the wrapper.

The party broke up about 11 p. m., and everyone had a good time.

Boston Branch

Boston branch met Friday, the 2d, at the American House, with President Nihan in the chair.

Election of officers took place and the following were elected: President, Ed. J. White; vice-president, Geo. C. Leach; secretary-treasurer, A. W. Garrett; sargeant-at-arms, Wm Simonetti; librarian, Philip Nelson; trustees, Jere. J. Nihan, chairman; Sam. Herrick, J. T. Evans, A. P. Williams, H. M. Wright.

A motion was made that we adjourn until the first Friday in September. The meeting adjourned at 10:30 p. m.

Toronto Branch

Dr. Blum addressed the Toronto members and a goodly number of others interested in electroplating, on Wednesday evening, April 9, in the Chemistry and Mining Building of Toronto University. We had hoped for a large audience, but owing to other attractions the turnout was scarcely a bumper houseful. Those present were well pleased with the lecture, and there is no doubt it will be productive of good results. Messrs. Mesle and Thurber of the Oneida Community Company were present and spent the following day visiting shops in and near Toronto.

On Monday evening, April 28, Mr. W. W. Wells, jr., presented a very interesting paper on "Nickel Anodes." He referred to cast, rolled and electrolytic types, and the troubles which are attributable to each. Special mention was made of difference in grain and the significance of each form, the subject and the manner of its presentation brought out considerable discussion and proved a real feature.

Chicago Branch

Chicago Branch held its regular meeting May 12, in the Atlantic Hotel, 316 South Clark street, which will be the new quarters. Judging from the remarks passed at the meeting the committee feels well repaid for their effort in securing such a meeting place.

We regret to announce the death of our member, Mr. F. C. Geimer, who was run down by a taxicab on April 28, and died in the Columbus Memorial Hospital on May 1.

Communications from New York, Detroit and St. Louis Branches were read and discussed. Two applications were read and three applicants elected.

The smoker committee informed the members that the smoker will take place June 14, in connection with our June meeting. All members will be notified in time.

We held election of officers with the following results: F. J. Hanlon, president; James Emmett, vice-president; Robert Meyers, 1116 Lill avenue, Chicago, Ill., secretary-treasurer; E. G. Stenberg, librarian; E. V. Allen, sargeant-at-arms. Board of managers, H. L. Perkins, E. V. Allen and E. Lomoreux; delegates to convention, F. J. Hanlon, H. A. Gilbertson and O. E. Servis; alternates, Wm. G. Bott, H. H. Posbeck and C. E. Thornton.

A general discussion followed on proposed amendments and conven-

tion matters pertaining to the welfare of the society, after which the branch voted that our delegates go to the Milwaukee Convention uninstructed.

Providence-Attleboro Branch

The Providence-Attleboro Branch, American Electroplaters' Society, held the most instructive lecture on March 6, through the courtesy of Dr. Blum, at the Engineers' Hall, Brown University.

About eighty men interested listened to the two-hour lecture, aided by stereopticon slides. After lecturing Dr. Blum answered questions from the audience.

Among those present were professors and students from Brown University, fellow and visiting platers and chemists from the local factories, some of whom came from the largest manufacturing plants of the world. This fact alone is proof that Dr. Blum of the American Electroplaters' Society gave a lecture instructive to the best men of the trade.

APPLICATIONS FOR MEMBERSHIP

Newark Branch

Roland Babourdin, active .....282 Summit Ave., West Hoboken, N. J.

Philadelphia Branch

Albert Kirsch, active .....1537 N. 13th St., Philadelphia, Pa.
Claude Bessler, active .....2840 Taney St., Philadelphia, Pa.

Detroit Branch

Harry Webb .....Joseph N. Smith Co., Detroit, Mich.

Chicago Branch

Walter Schoeman, active .....1371 E. 70th St., Chicago, Ill.
C. A. Crumpton, associate .....636 Park Place, Chicago, Il

ELECTED TO MEMBERSHIP

Boston Branch

Harry M. Wright, active.....25 Bickerstaff St., Suite 4, Boston, Mass.

Detroit Branch

Louis J. Berger, active.....3618 Canton Ave., Detroit, Mich.

Chicago Branch

Harold C. Posbeck, active .....5248 Irving Park Blvd., Chicago
J. S. Papierz, active .....2022 Augusta St., Chicago, Ill.
C. A. Reed, active .....610 Wrightwood Ave., Chicago, Ill.

RESIGNATIONS

New York Branch

E. C. Kornhoff .....62 Marcellus Place, Carfield, N. J.

Providence-Attleboro Branch

P. C. Cavanaugh .....260 Commonwealth Ave., Attleboro Falls, Mass.

SUSPENDED

Chicago Branch

F. L. Shipera .....Western Springs, Ill.

DEATHS

Chicago Branch—Mr. T. C. Gevner
New York Branch—Mr. D. Shoonmaker

MILWAUKEE BRANCH

Invites YOU to the

NATIONAL CONVENTION

of the

American Electroplaters Society

June 30, July 1, 2, 3, 1924.

Headquarters---Hotel Pfister

This will be the greatest convention of the Society.

There will be plenty of interesting papers and information to repay you for this visit.

Exhibits of special finishes for which prizes will be awarded; also trips through the industrial plants and plating rooms, a trip to Waukesha Beach resort, fish dinner, trip on Lake Pewankee, bathing, dancing and amusements will be part of the entertainment features.

Special Program for the Ladies During Business Sessions

All Platers, Superintendents and Managers of Plants where Electroplating is done should attend this gathering of Platers.